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Current Trends in Vector Control: Adapting to Selective Pressure

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The mission of the Division of Entomology, Walter Reed Army Institute of Research, is to mitigate the risk posed by arthropods to DoD personnel through its research efforts in personal protective measures (PPMs), surveillance methods, vector identification, and disease diagnostics. The direct threats posed by arthropods are the vector-borne diseases that they may transmit and the potential for allergic reactions and secondary infections from the bites themselves. However, there are also substantial indirect threats in terms of expenditures on medical treatment and medical evacuation, decreased morale, and impacts on mission due to lost manpower days and decreased unit effectiveness. To tackle research needs, the Division of Entomology is divided into 6 departments, each focusing on a different aspect of the overall mission of the division. Research in the Department of Vector Control focuses specifically on PPMs, vector surveillance, and control methods. Our research needs are driven by the experiences and lessons learned from contingency operations that take place all over the world.

Research in vector control evolves as a result of lessons learned and other external factors. For example, the current operational environment has highlighted new needs, particularly with respect to the incidence of leishmaniasis and sand fly fever, sand fly control measures, and noncompliance in using

PPMs. In addition, rapidly changing technologies bring new, innovative products to the forefront that may fulfill mission needs. The Department of Vector Control (and the Division of Entomology) tackles these evolving needs by adopting a multi-faceted approach. We leverage small businesses and the commercial sector to meet our needs through the Small Business and Innovative Research (SBIR) program and various cooperative agreements. We seek early buy-in from our end-user and interested parties, such as the Armed Forces Pest Management Board and Program Executive Office Soldier.

Vector Control has multiple projects in the three research areas: PPMs, vector surveillance, and vector control. In PPMs, current research focuses heavily on a new topical repellent formulation to replace or augment the current DEET-based military repellent; a personal, wearable repellent device that would provide a long-lasting spatial effect; and improved bed nets and bed net materials. In vector surveillance, current projects include a field-deployable CO₂ generator and sand fly attractants. Current vector control projects include a new residual insecticide formulation for hot, desert environments; a rodent treatment and bait box; and barrier treatments and treated flooring to control sand flies. In nearly all of these projects, funding comes from multiple sources and research is accomplished via multiple collaborative partners and agreements

(Cooperative Research and Development Agreements, Material Transfer Agreements). This approach allows us to more effectively conduct research on a greater number of vector control projects and products to fulfill our mission and to meet the needs of U.S. Army entomologists and other DoD personnel in mitigating the risk posed by arthropods and vector-borne diseases.